Notice of Allowability	Application No.	Applicant(s)	
	10/500,342	IORDANESCU ET AL.	
	Examiner	Art Unit	
	EDWARD PARK	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendments and remarks received on 2/2/09*.

2. ☒ The allowed claim(s) is/are *1-10, 13-21 (to be re-numbered as 1-19)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20090331* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Edward Park/
Examiner, Art Unit 2624

EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/2/09 has been entered.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Sheila P. Martinez-Lemke (Reg #: 52,004) on 4/3/09.

The application has been amended as follows:

1. (currently amended) An automated detection algorithm embodied in a computer readable medium, the automated detection algorithm to compute ~~the~~ a ring profile of colon like ~~surfaces~~ surface comprising the steps of:

providing an original image of ~~a~~ the colon like surface disposed along a major axis in a scan having vertex points, each vertex point having a discrete point identifier and three dimensional position information;

generating a shrunken version of the colon like surface utilizing neighbors averaging of the three dimensional position information for every vertex point in the original colon view, wherein the shrunken version of the colon like surface has a same number of vertices as the original image of the colon like surface;

modeling the shrunken version of the colon like surface with an ordered set of 3-D points to produce a curve proximate to the major axis of the colon like surface;

isolating segments of vertex points between planes normal to the curve proximate to the major axis of the colon like surface from the shrunken version of the colon like surface; and

mapping the isolated segments of vertex points from the shrunken version of the colon like surface back to the original image of the colon like surface to generate a ring profile of the colon like surface.

2. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 1 comprising the steps of: decimating the vertex points of the provided original image.

3. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 1 comprising the steps of: computing a centerline of the colon utilizing the ring profile of the colon like surface.

4. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 3 comprising the steps of: measuring along the

computed centerline of the colon like surface to determine positional information relative to the colon like surface.

5. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 3 comprising the steps of: smoothing the computed centerline of the colon.

6. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 3 comprising the steps of: utilizing the ring profile along a preselected length of the computed colon centerline to determine the local colon volume and local colon distension along the preselected length of the colon.

7. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 3 comprising the steps of: mapping the vertices distance to the computed centerline; and building an image of vertices distances to centerline to map the colon.

8. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 3 comprising the steps of: mapping the vertices distance to the computed centerline to obtain a mapped centerline view of the colon;
rotating the mapped centerline view of the colon to spatially reorient the mapped centerline view of the colon; and reconstructing a spatially reoriented image of the colon from the rotated centerline view by expanding the vertices distances to map the colon.

9. (currently amended) An automated detection algorithm embodied in a computer readable medium, the automated detection algorithm to compute ~~the~~ a ring profile of a colon like ~~surfaces~~ surface comprising the steps of:

providing an original image of the colon like ~~surfaces~~ surface disposed along a major axis in a scan having the colon like surface identified by vertex points, each vertex point having a discrete point identifier and three-dimensional positional information;

generating a shrunken image of the colon like surface utilizing neighbors averaging of the three-dimensional positional information for vertex points in the original colon view, wherein the shrunken version of the colon like surface has a same number of vertices as the original image of the colon like surface;

randomly designating a first vertex modeling point at a vertex point along the shrunken colon image;

identifying and marking neighboring vertex points to the randomly selected first vertex modeling point;

designating a second vertex modeling point located at a predetermined distance from the first vertex modeling point;

sequentially repeating the identifying and marking, and designating steps to designate vertex modeling points from the randomly selected first vertex modeling point to an end of the colon;

connecting the designated vertex modeling points to produce a curve proximate to the major axis of the colon like surface;

isolating groups of vertex points between plans normal to the curve from the shrunken image of the colon like surface; and

mapping the isolated groups of vertex points from the shrunken image of the colon like surface back to the original image of the colon like surface to generate a ring profile of the colon like surface.

10. (currently amended) An automated detection algorithm embodied in a computer readable medium, the automated detection algorithm to compute an approximate centerline profile of a colon like ~~surfaces~~ surface or to compute a ring profile of the colon like surface comprising the steps of:

providing an original image of the colon like ~~surfaces~~ surface disposed along a major axis in a scan having the colon like surface identified by vertex points, each vertex point having a discrete point identifier and three-dimensional positional information;

generating a shrunken image of the colon like surface utilizing a neighbors averaging of the three-dimensional positional information for vertex points in the original colon view, wherein the shrunken version of the colon like surface has a same number of vertices as the original image of the colon like surface;

randomly designating a first vertex modeling point at a vertex point along the shrunken colon image;

identifying and marking neighboring vertex points to the randomly selected first vertex modeling point;

designating a second vertex modeling point located at a predetermined distance from the first of vertex modeling point;

sequentially repeating the identifying and marking, and designating steps to designate vertex modeling points from the randomly selected first vertex modeling point to an end of the colon; and connecting the designated vertex modeling points to produce a curve proximate to the major axis of the colon like surface.

11 -12. (cancelled)

13. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 3, wherein computing ~~a~~ the centerline of the colon utilizing the ring profile of the colon like surface comprises determining ~~the~~ a center point of a bounding box associated with the ring profile, wherein the centerline includes the center point of the bounding box.

14. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 1, wherein the shrunken version of the colon like surface is associated with a smaller bounding box than the original image of the colon like surface.

15. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 1 wherein the shrunken version of the colon like surface has substantially less volume than the original image of the colon like surface.

16. (currently amended) The automated detection algorithm to compute the ring profile of the colon like ~~surfaces~~ surface according to claim 1 wherein generating ~~a~~ the shrunken version of the colon like surface utilizing neighbors averaging of the three dimensional position information for every vertex point in the original colon view includes iteratively averaging the three dimensional positional information.

17. (currently amended) A computer readable medium embodying ~~comprising~~ code executable on a processor, the computer readable medium comprising:
code for providing a colon-like surface having original points, wherein each original point has original coordinates comprising a first coordinate, a second coordinate and a third coordinate;

code for generating a set of revised points by iteratively averaging each of the coordinates of adjacent points connected to each original point,

wherein a first iteration sums the first coordinate of adjacent points and divides by a number of adjacent points to generate a revised first coordinate, sums the second coordinate of adjacent points and divides by the number of adjacent points to generate a revised second coordinate, and sums the third coordinate of adjacent points and divides by the number of adjacent points to generate a revised third coordinate,

wherein subsequent iterations sum a previously revised first coordinate of adjacent points and divides by the number of adjacent points to generate a newly revised first coordinate, sums the previously revised second coordinate of adjacent points and divides by the number of adjacent points to generate a newly revised second coordinate, and sums the previously revised third coordinate of adjacent points and divides by the number of adjacent points to generate a newly revised third coordinate; and

code for generating a reduced volume representation of the colon-like surface by compiling the revised points.

18. (previously presented) The computer readable medium of claim 17 wherein the reduced volume representation has a volume that is substantially less than a volume of the colon-like surface.

19. (previously presented) The computer readable medium of claim 17 further comprising:

code for extracting a set of revised points from the reduced volume representation;

code for interpolating a curve from the set of revised points;

code for generating a set of equally distanced planes perpendicular to the curve;

code for dividing the reduced volume representation into segments using the equally distanced planes;

code for generating ring-like sections of the colon-like surface by mapping the revised points in each of the segments to the original points of the colon-like surface; and code for computing a centerline of the colon utilizing the ring-like sections of the colon-like surface.

20. (currently amended) The computer readable medium of claim 19 wherein code for computing the centerline of the colon utilizing the ring-like sections of the colon-like surface comprises:

code for generating bounding boxes enclosing each of the ring-like sections;

code for determining center points of the bounding boxes; and

code for generating the centerline by connecting the center points.

21. (previously presented) The computer readable medium of claim 19 wherein code for extracting the set of revised points from the reduced volume representation comprises:

code for selecting a first point near an end of the reduced volume representation;

code for selecting a second point at a preselected distance from the first point on the reduced volume representation;

code for defining a vector from the first point to the second point;

code for determining a subsequent point on the reduced volume representation at the preselected distance from the second point using the vector;

code for defining a subsequent vector from the second point to the subsequent point;

code for determining another subsequent point on the reduced volume representation at the preselected distance from the subsequent point using the subsequent vector;
and code for determining remaining points of the set of points by repeating the defining the subsequent vector and determining another subsequent point steps.

Allowable Subject Matter

3. Claims 1-10, 13-21 (to be re-numbered as 1-19) are allowed.

4. The following is an examiner's statement of reasons for allowance:
Regarding claim 1, the most relevant prior art of record, Vining reference, teaches providing an original image of the colon like surface disposed along a major axis in a scan having vertex points, each vertex point having a discrete point identifier and three dimensional position information (see Final Rejection on 9/4/08).

Applicant's claimed invention distinguishes over the Vining reference by generating a shrunken version of the colon like surface utilizing neighbors averaging of the three dimensional position information for every vertex point in the original colon view, wherein the shrunken version of the colon like surface has a same number of vertices as the original image of the colon like surface; modeling the shrunken version of the colon like surface with an ordered set of 3-D points to produce a curve proximate to the major axis of the colon like surface; isolating segments of vertex points between planes normal to the curve proximate to the major axis of the colon like surface from the shrunken version of the colon like surface; mapping the isolated

segments of vertex points from the shrunken version of the colon like surface back to the original image of the colon like surface to generate a ring profile of the colon like surface.

Regarding claim 9, the most relevant prior art of record, Vining reference, teaches providing an original image of the colon like surface disposed along a major axis in a scan having the colon like surface identified by vertex points, each vertex point having a discrete point identifier and three-dimensional positional information (see Final Rejection on 9/4/08).

Applicant's claimed invention distinguishes over the Vining reference by generating a shrunken image of the colon like surface utilizing neighbors averaging of the three-dimensional positional information for vertex points in the original colon view, wherein the shrunken version of the colon like surface has a same number of vertices as the original image of the colon like surface; randomly designating a first vertex modeling point at a vertex point along the shrunken colon image; identifying and marking neighboring vertex points to the randomly selected first vertex modeling point; designating a second vertex modeling point located at a predetermined distance from the first vertex modeling point; sequentially repeating the identifying and marking, and designating steps to designate vertex modeling points from the randomly selected first vertex modeling point to an end of the colon; connecting the designated vertex modeling points to produce a curve proximate to the major axis of the colon like surface; isolating groups of vertex points between plans normal to the curve from the shrunken image of the colon like surface; and mapping the isolated groups of vertex points from the shrunken image of the colon like surface back to the original image of the colon like surface to generate a ring profile of the colon like surface.

Regarding claim 10, the most relevant prior art of record, Vining reference, teaches providing an original image of the colon like surface disposed along a major axis in a scan having the colon like surface identified by vertex points, each vertex point having a discrete point identifier and three-dimensional positional information (see Final Rejection on 9/4/08).

Applicant's claimed invention distinguishes over the Vining reference by generating a shrunken image of the colon like surface utilizing a neighbors averaging of the three-dimensional positional information for vertex points in the original colon view, wherein the shrunken version of the colon like surface has a same number of vertices as the original image of the colon like surface; randomly designating a first vertex modeling point at a vertex point along the shrunken colon image; identifying and marking neighboring vertex points to the randomly selected first vertex modeling point; designating a second vertex modeling point located at a predetermined distance from the first of vertex modeling point; sequentially repeating the identifying and marking, and designating steps to designate vertex modeling points from the randomly selected first vertex modeling point to an end of the colon; and connecting the designated vertex modeling points to produce a curve proximate to the major axis of the colon like surface.
Regarding claim 17, the most relevant prior art of record, Vining reference, teaches code for providing a colon-like surface having original points, wherein each original point has original coordinates comprising a first coordinate, a second coordinate and a third coordinate.

Applicant's claimed invention distinguishes over the Vining reference by having code for generating a set of revised points by iteratively averaging each of the coordinates of adjacent points connected to each original point, wherein a first iteration sums the first coordinate of adjacent points and divides by a number of adjacent points to generate a revised first coordinate,

sums the second coordinate of adjacent points and divides by the number of adjacent points to generate a revised second coordinate, and sums the third coordinate of adjacent points and divides by the number of adjacent points to generate a revised third coordinate, wherein subsequent iterations sum a previously revised first coordinate of adjacent points and divides by the number of adjacent points to generate a newly revised first coordinate, sums the previously revised second coordinate of adjacent points and divides by the number of adjacent points to generate a newly revised second coordinate, and sums the previously revised third coordinate of adjacent points and divides by the number of adjacent points to generate a newly revised third coordinate; and code for generating a reduced volume representation of the colon-like surface by compiling the revised points.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD PARK whose telephone number is (571)270-1576. The examiner can normally be reached on M-F 10:30 - 20:00, (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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